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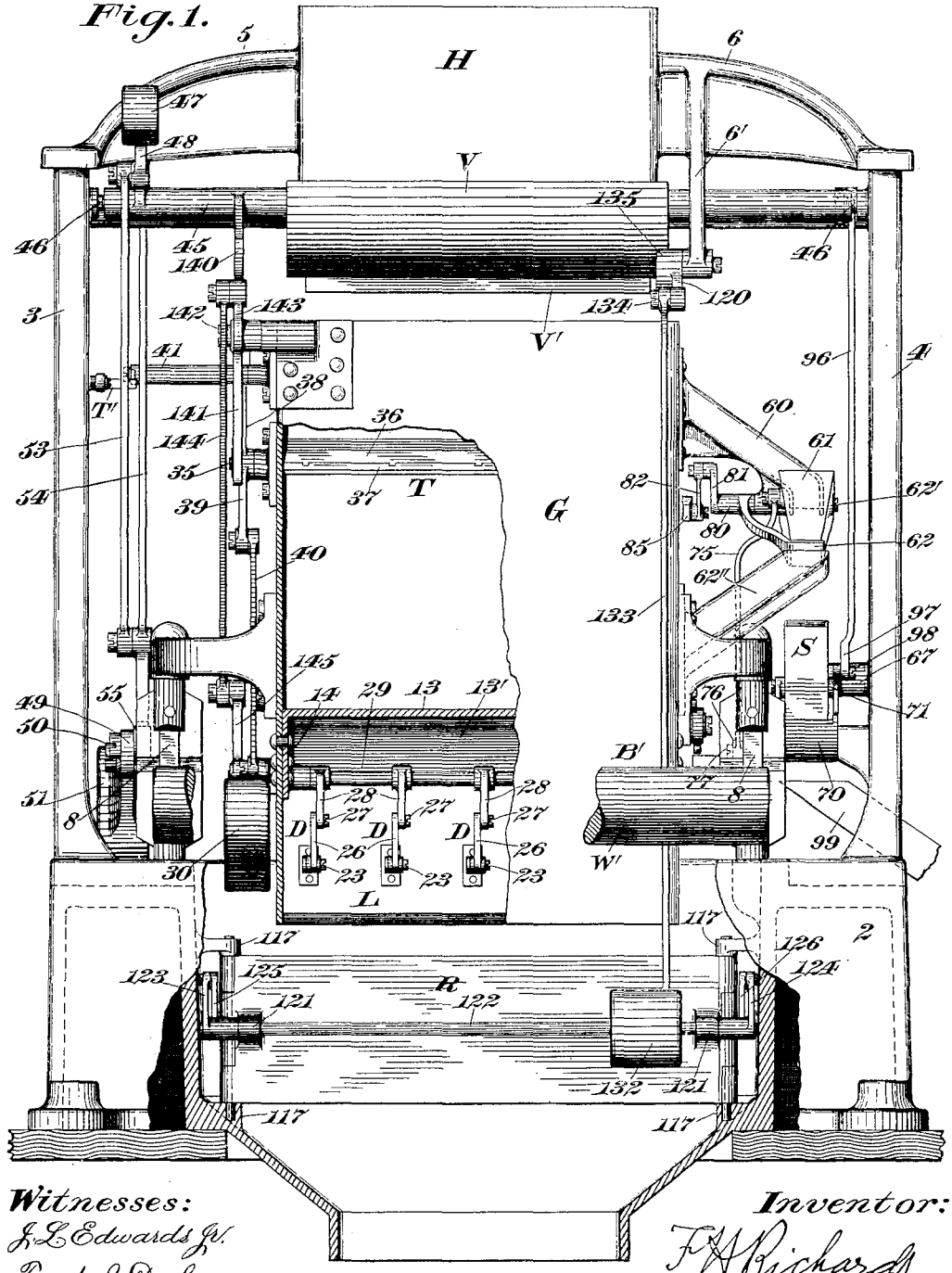
F. H. RICHARDS.

WEIGHING MACHINE.

No. 600,038. Patented Mar. 1, 1898.

Fig. 1.



Witnesses:
J. L. Edwards Jr.
Fred. J. Dole.

Inventor:
F. H. Richards.

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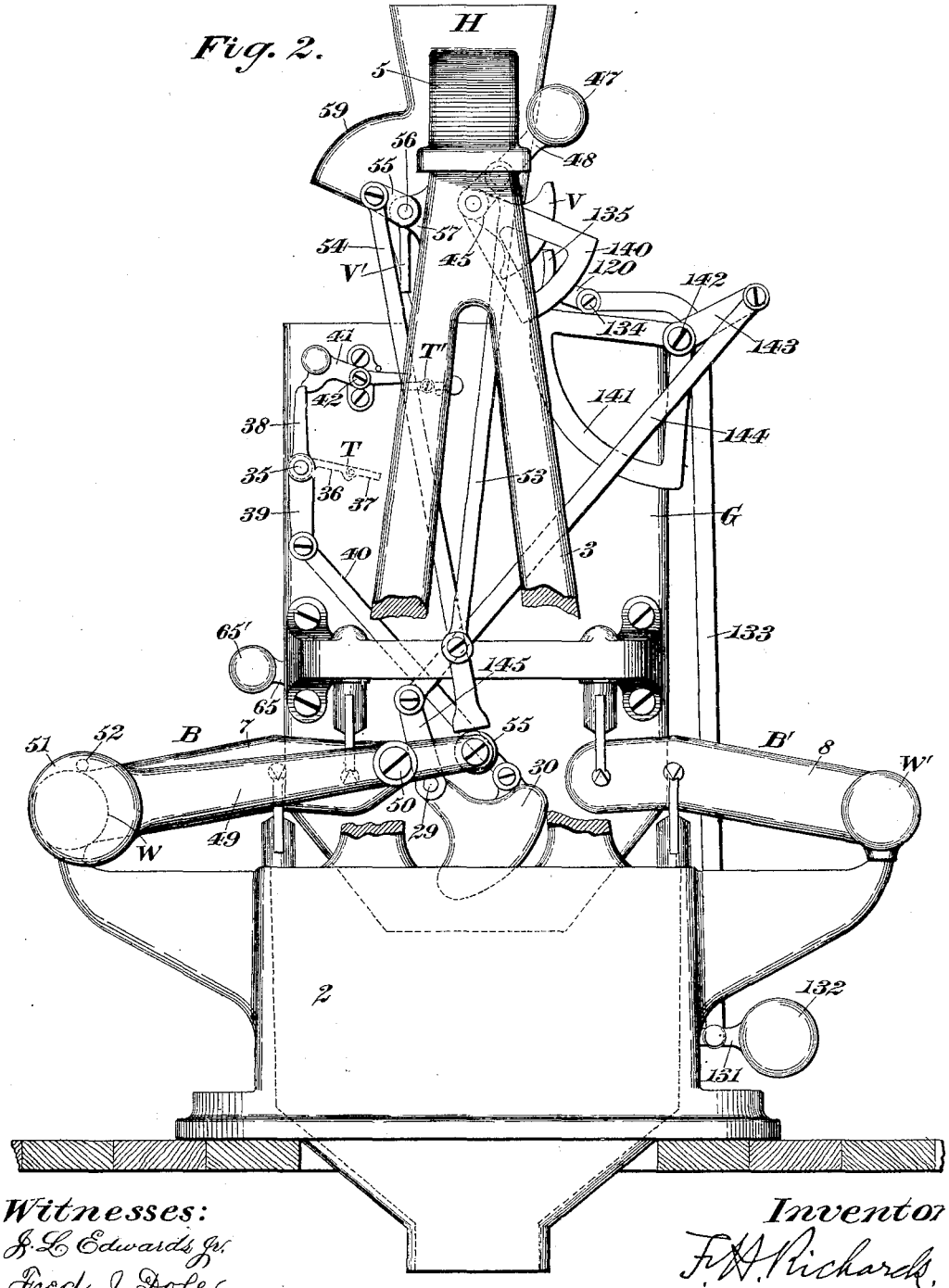
Fig. 2.



Witnesses:
J. L. Edwards Jr.
Fred. J. Dole.

Inventor
F. H. Richards.

(No Model.)

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F. H. RICHARDS.

WEIGHING MACHINE.

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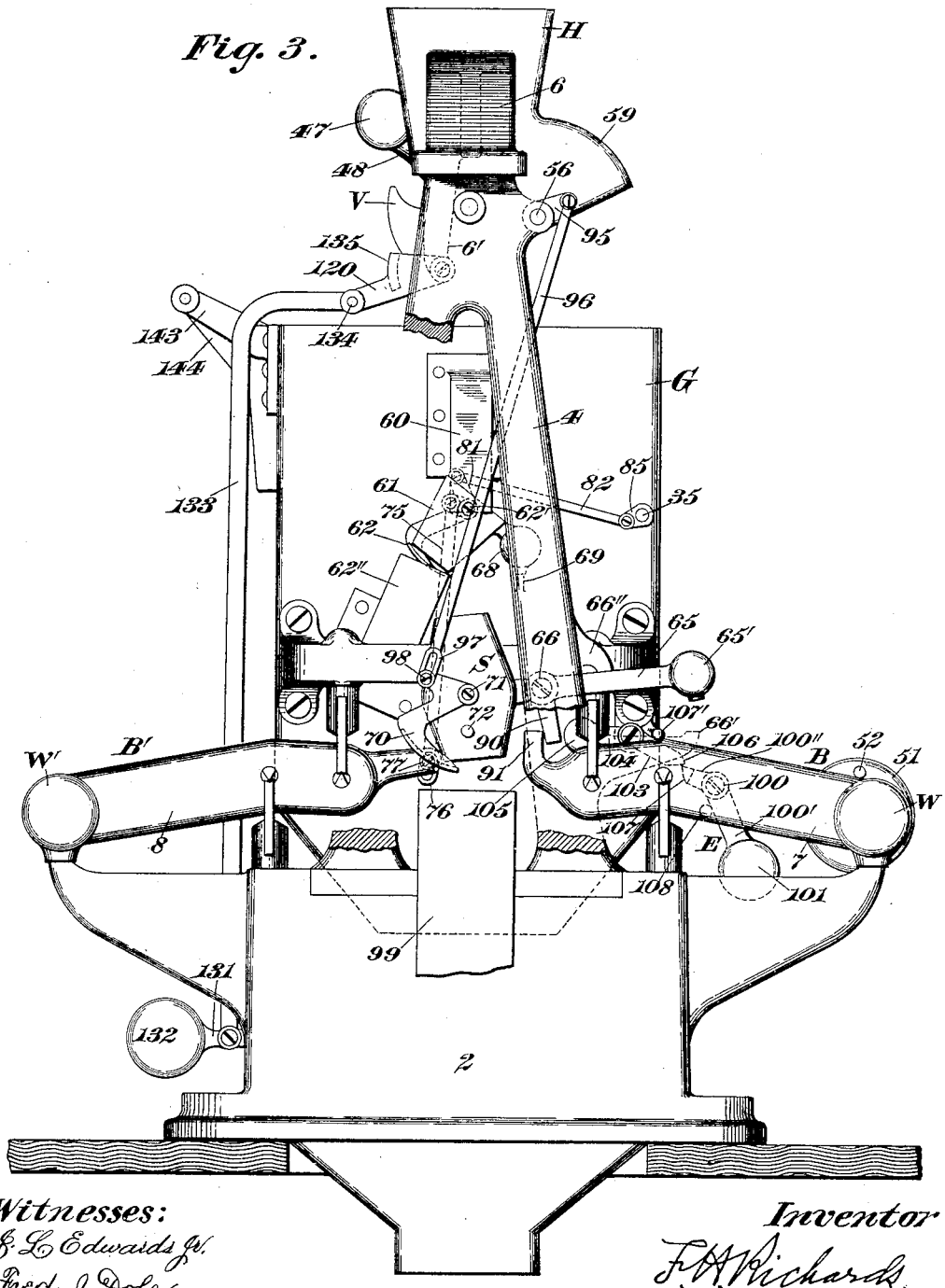
Fig. 3.



Witnesses:
F. L. Edwards Jr.
Fred. J. Dole.

Inventor
F. H. Richards.

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F. H. RICHARDS.

WEIGHING MACHINE.

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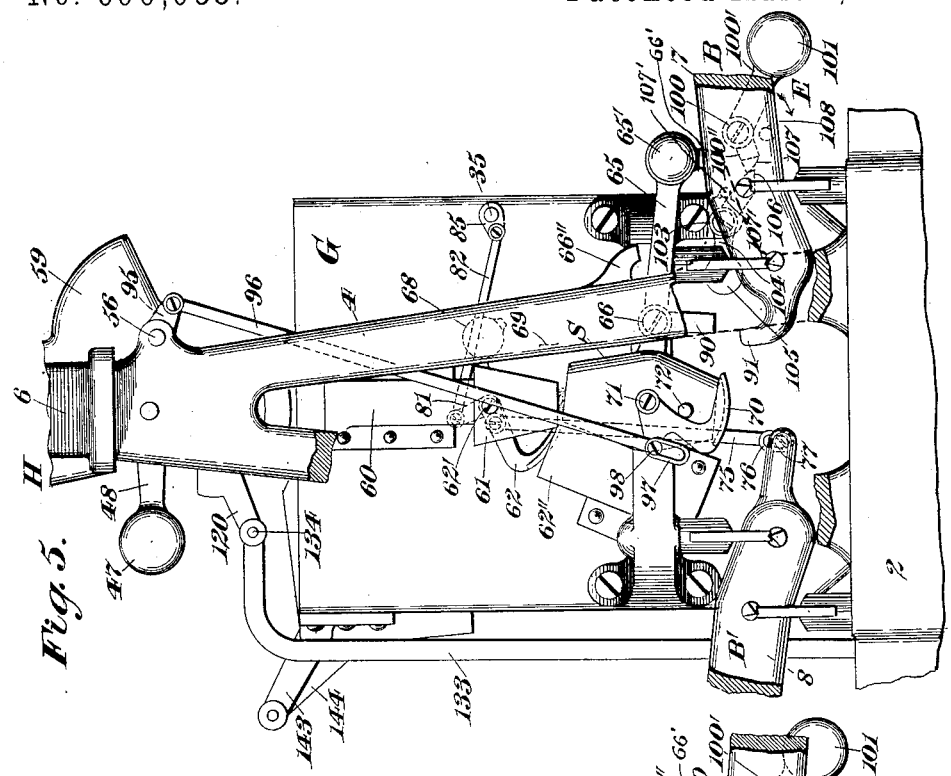

Fig. 5.

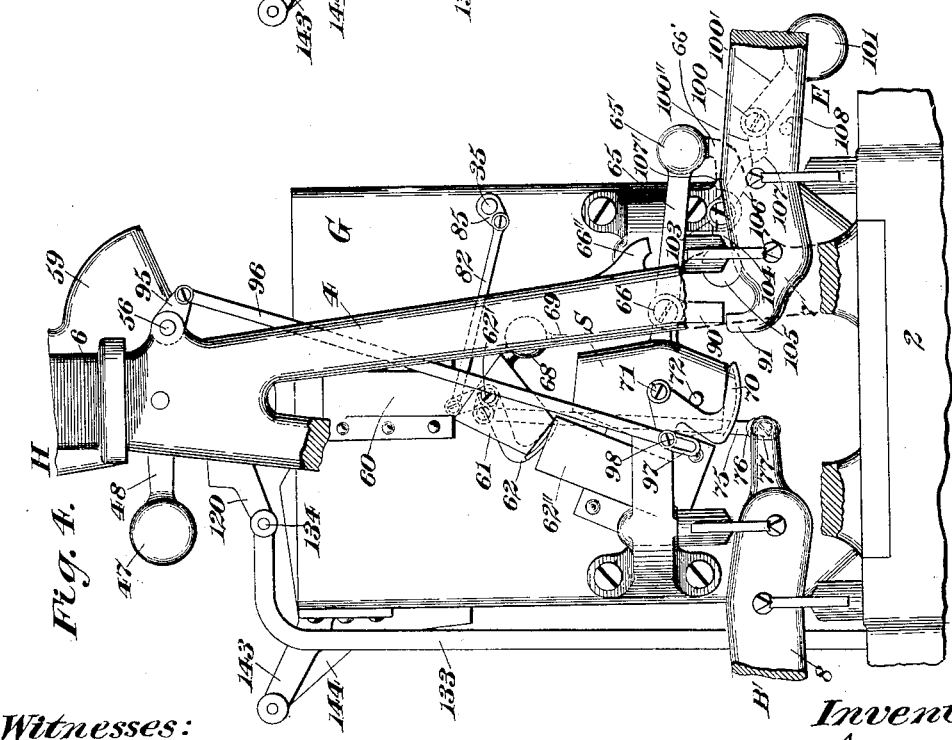

Fig. 4.

Witnesses:
F. L. Edwards Jr.
Fred. J. Dole.

Inventor:
F. H. Richards.

(No Model.) 8 Sheets—Sheet 5.

F. H. RICHARDS.

WEIGHING MACHINE.

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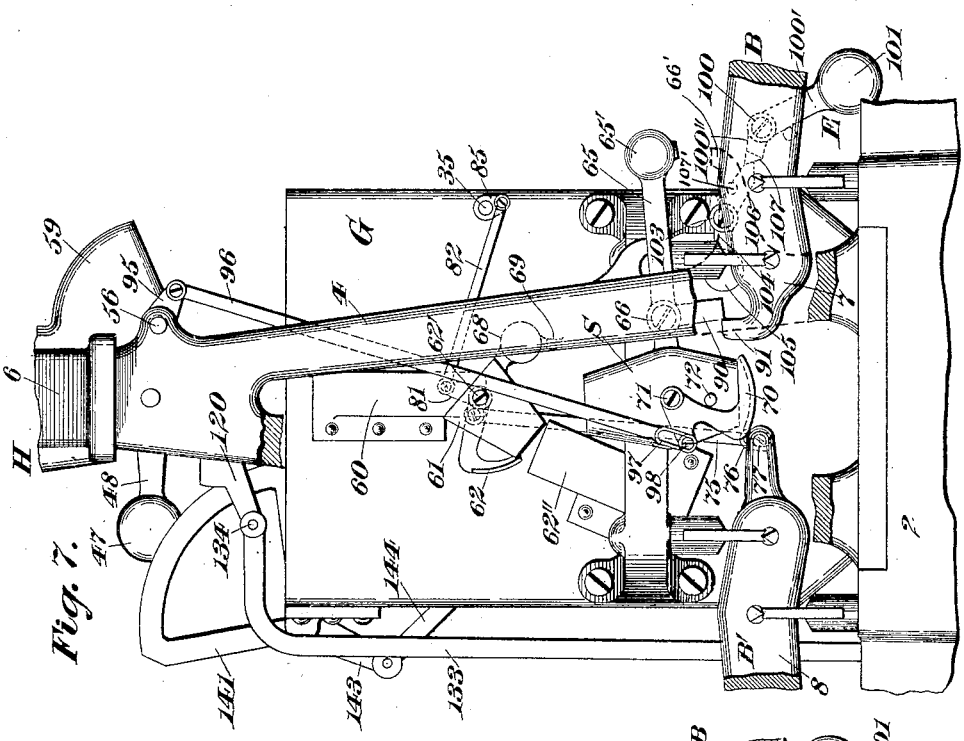

Fig. 7.

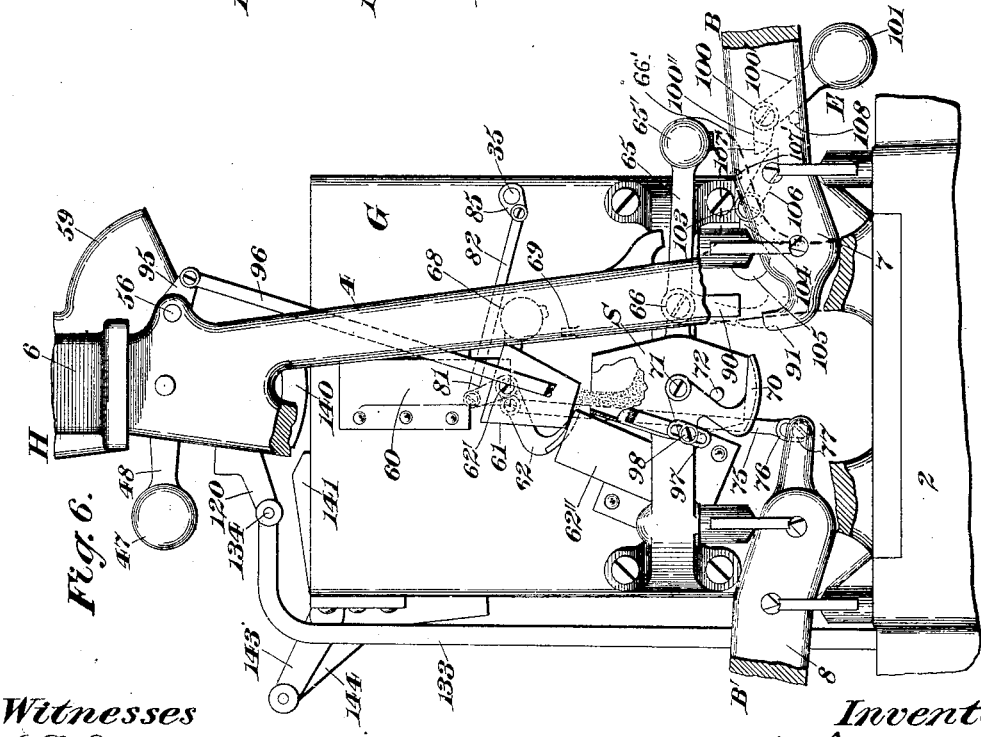

Fig. 6.

Witnesses
F. L. Edwards Jr.
Fred. J. Dole.

Inventor:
F. H. Richards.

(No Model.)

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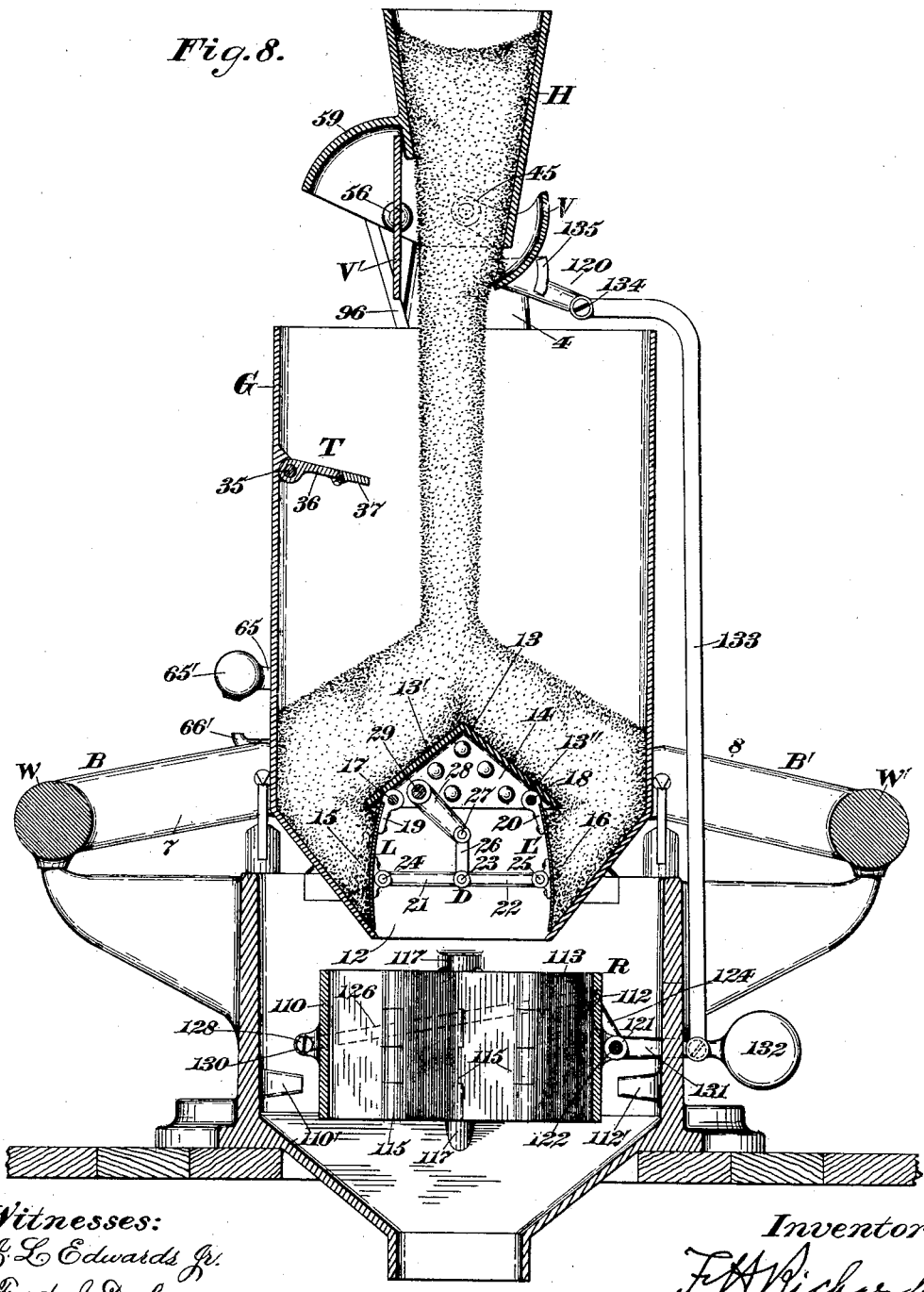
F. H. RICHARDS.

WEIGHING MACHINE.

No. 600,038. Patented Mar. 1, 1898.

Fig. 8.



Witnesses:
J. L. Edwards Jr.
Fred. J. Dole.

Inventor:
F. H. Richards.

(No Model.)

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F. H. RICHARDS.

WEIGHING MACHINE.

No. 600,038. Patented Mar. 1, 1898.

Fig. 9.

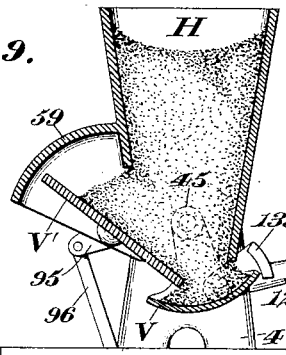

Fig. 10.

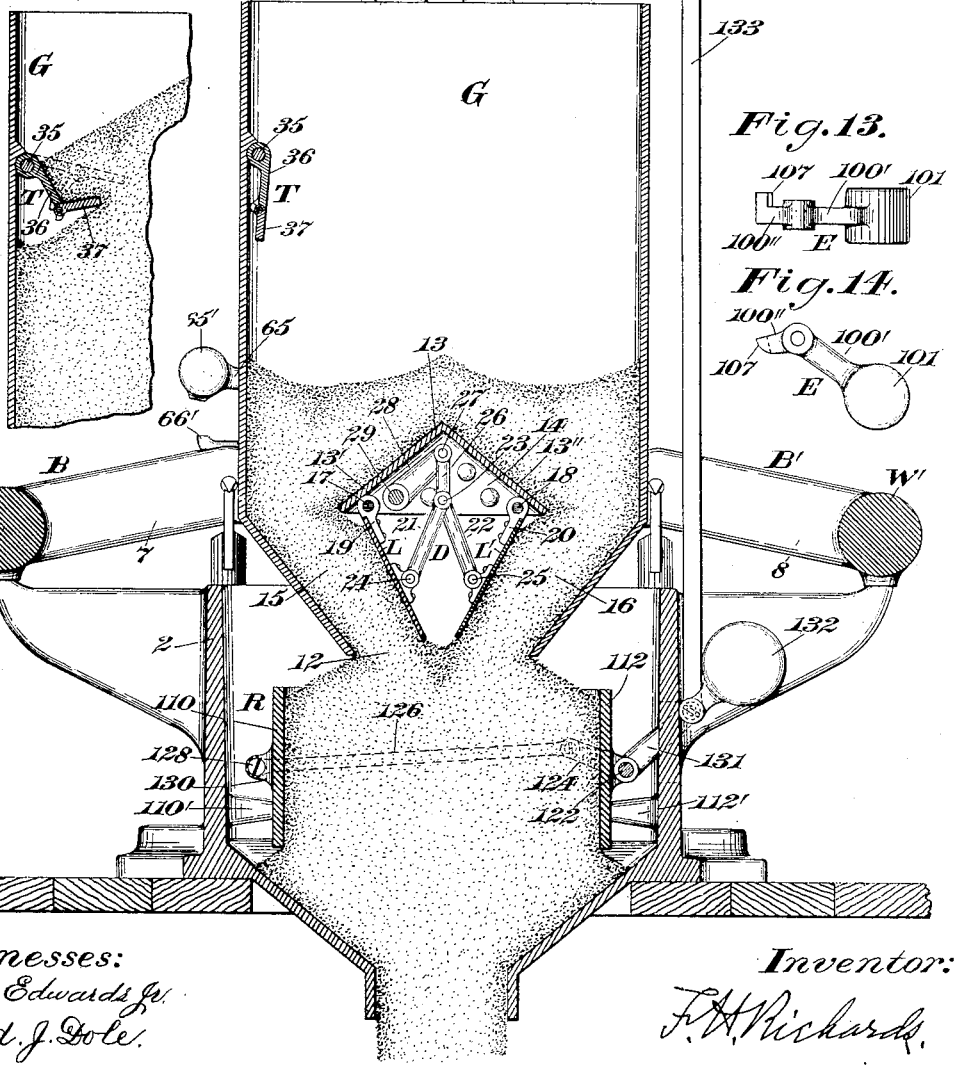

Fig. 13.

Fig. 14.

Witnesses:
F. L. Edwards Jr.
Fred. J. Dole.

Inventor:
F. H. Richards.

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F. H. RICHARDS.

WEIGHING MACHINE.

No. 600,038. Patented Mar. 1, 1898.

Fig. 11.

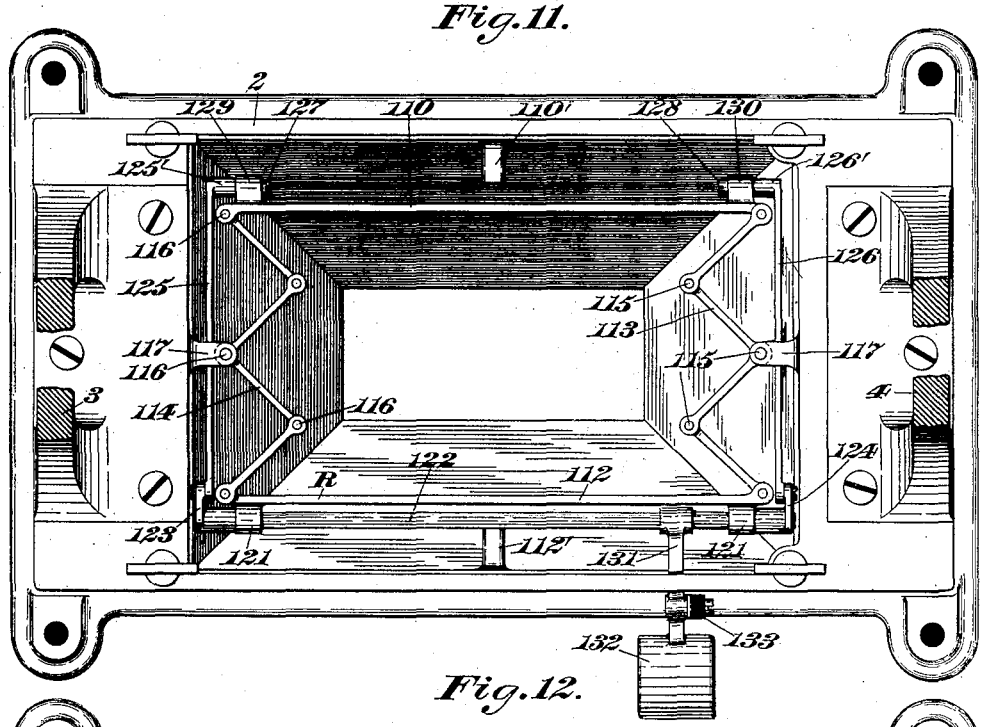
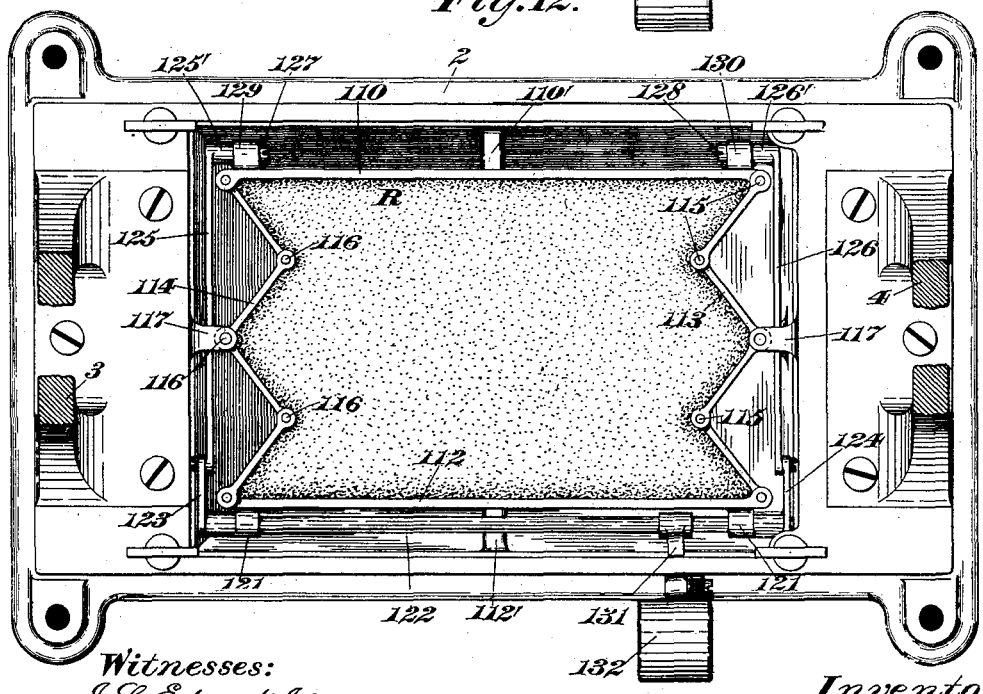


Fig. 12.



Witnesses:
J. L. Edwards Jr.
Fred J. Dole.

Inventor.
F. H. Richards.

UNITED STATES PATENT OFFICE.

FRANCIS H. RICHARDS, OF HARTFORD, CONNECTICUT.

WEIGHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 600,038, dated March 1, 1898.

Application filed July 24, 1897. Serial No. 645,819. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Weighing-Machines, of which the following is a specification.

This invention relates to weighing-machines, the object being to provide an improved machine of this character certain of the features of which are particularly applicable for use in connection with machines of the class disclosed by Letters Patent No. 572,067, granted to me November 24, 1896.

In the drawings accompanying and forming part of this specification, Figure 1 is a front elevation of a weighing-machine embodying my present invention. Fig. 2 is a side elevation of the same as seen from the right in Fig. 1, the parts being in positions corresponding with said figure. Fig. 3 is a side elevation as seen from the left in Fig. 1, the parts being in position corresponding with Figs. 1 and 2. Figs. 4, 5, 6, and 7 are side elevations as seen from the left in Fig. 1, showing the positions assumed by the principal parts of the machine at several stages in its operation. Figs. 8 and 9 are longitudinal central sections of the machine, representing, respectively, a partial load in the receiver and a load as being discharged therefrom. Fig. 10 is a sectional detail view showing the action of a toggle-breaker. Figs. 11 and 12 are sectional plan views of the regulator; and Figs. 13 and 14 are detail views, in plan and side elevation, respectively, of a resistance device.

Similar characters designate like parts in all the figures of the drawings.

The framework for supporting the various parts of the machine may be of any convenient construction. It is represented consisting of the chambered base or bed 2, the side frames 3 and 4, and the brackets 5 and 6, extending oppositely from the supply-hopper H.

My present invention comprehends, preferably, overloading and load-reducing means operative in combination with the load-receiver of the weighing mechanism. The overloading means is adapted to supply said load-receiver with an overload or quantity of material in excess of the predetermined load, the removal of the surplus being subsequently effected by the load-reducing means, as will hereinafter appear. The supply-hopper H, in conjunction with suitable stream-controlling means, constitutes a convenient medium for furnishing the necessary overload.

The weighing mechanism consists of a load-receiver and counterpoising means therefor, such as a plurality of scale-beams, and it is substantially similar to that disclosed by the Letters Patent to which I have hereinbefore alluded and to which reference may be had, it consisting of a hopper-shaped receptacle or bucket G, mounted upon the poising ends of the scale-beams B and B′, respectively, the latter being supported for oscillation on the base 2. Each of the scale-beams consists of a pair of arms joined at their opposite ends by a counterweight. The arms of the beam B are designated by 7 and are joined by the weight W, and the arms of the beam B′ are designated by 8 and are connected by the weight W′.

The load-receiver (see Figs. 8 and 9) has an opening 12, through which the loads of material can intermittingly pass on the release of the closers.

A plurality of closers, such as L and L′, respectively, are provided, they being disposed vertically in the load-receiver, as indicated in Fig. 8, and suspended for oscillation beneath the hood or roof 13, preferably of inverted-V shape, the hood or roof acting as a guard to protect the pivots of the closers and also to support the major part of the load.

The end walls 14 of the protecting-hood 13 can be riveted or otherwise secured to the opposite side walls of the load-receiver G. The hood 13 is so situated in the load-receiver as to form between the lower edges of its inclined walls 13′ and 13″ and the load-receiver the discharge-openings 15 and 16, respectively, which are covered normally by the two closers L and L′, disposed in the load-receiver, the pivots 17 and 18 of said closers passing through ears 19 and 20, secured near the upper edges thereof and working in bearings in the end walls 14 of the hood 13.

The closers L and L′ are normally held in their shut position by a locker or lockers, such as D. The lockers in the form of the invention represented consist of toggles, each constructed of a pair of links, as 21 and 22, pivoted to each

other, as at 23, and also to the closers L and L′, respectively, as at 24 and 25. (See Figs. 8 and 9.)

In Fig. 8, wherein the closers are represented as shut, the pivotal points 23, 24, and 25 are represented in horizontal alinement, whereby the said closers are firmly maintained in such position without the intervention of a latch, and by reason of their mounting in the load-receiver in the manner hereinbefore specified the pressure necessary to maintain them shut is materially reduced, a large part of the load being sustained by the fixed hood 13. The toggles D are connected with the links 26, the pivots 23 passing through the lower end of said links. The links 26 are pivoted, as at 27, at their upper ends to the crank-arms 28 on the rock-shaft 29, whose opposite ends are journaled in the side walls of the load-receiver.

When the toggles D are broken, (this object being accomplished by a suitable device, as will hereinafter appear,) the three pivotal points 23, 24, and 25 will be thrown out of line by the material acting against the closers L and L′, so that they can be opened promptly, as indicated in Fig. 9, to permit the load to pass from the receiver. When the entire load has been discharged, the two closers will be returned to their shut positions and locked by the toggles D, and for effecting these two functions the actuating-weight 30 is provided, it being affixed to one end of the shaft 29. When the closers are opened or swung toward each other, the weight 30 will be elevated, and as soon as the discharged material has passed clear of the two closers they are released and the weight 30 will drop to shut them.

The toggle-breaker may be of any suitable construction. It is represented consisting of a device or shelf T in the load-receiver operated by the material being weighed. The toggle-breaker T is affixed to the shaft 35, whose opposite ends are journaled in the side walls of the load-receiver, the toggle-breaker being in two sections or leaves 36 and 37, respectively. The shaft 35 at its outer end has secured thereto the oppositely-disposed arms 38 and 39, the former being preferably engaged by a suitable detent or latch and the latter being connected with the closer-operating weight 30 by the link 40, pivoted at its opposite ends, respectively, to these parts. The latch for engaging the crank-arm 38 is designated by 41, it being counterweighted and of usual construction and pivoted, as at 42, near the upper end of the load-receiver.

When the closers L and L′ are shut, as represented in Fig. 2, the supply-stream from the hopper H will descend into the load-receiver to overload the same, the material approaching and subsequently covering the upper face of the shelf or toggle-breaker T, as indicated by the dotted lines in Fig. 10, it being evident that during this stage of the operation the toggle-breaker is held against movement by the latch 41. On the completion of the load the latch is disengaged from the arm 38, thereby releasing the toggle-breaker or shelf T, so that the mass of material banked thereon will force it downward, the joint between the two sections being broken on the initial movement of the device as the toggle-breaker commences to drop. When the device T thus acts, the shaft 35 is rocked and the crank-arm 39 swung slightly to the left, the link 40 and weight 30 being elevated, thereby rocking the shaft 29, and consequently throwing the centers 23, 24, and 25 of the several closer-locking toggles out of alinement, so that the closers can be forced wholly open by the force of the material.

It will be remembered that my present invention comprehends the provision of overloading and load-reducing means successively effective and that the supply-hopper H, in combination with stream-controlling means, constitutes a convenient device for overloading the load-receiver G.

The stream-controlling means in the present case consists of a plurality of valves V and V′, the valve V being in the form of an oscillatory pan, and the valve V′ consisting of a blade supported between its opposite edges for oscillation, the two valves coöperating to cut off the supply to the load-receiver when the latter is overcharged. The valve V swings below the outlet of the hopper H and is carried by the two-part shaft 45, having journal-openings in its opposite ends to receive the screws 46 on the side frames 3 and 4, respectively.

The means illustrated for closing the valve V consists of the weight 47, secured to the arm 48, extending rearward from the valve-shaft 45, said weight exerting a constant valve-closing force that is limited, preferably, by the weighing mechanism, as by the shifting lever 49, pivoted, as at 50, to the beam B.

The weight 51 of the lever 49 is furnished with a stop 52, normally resting on the adjacent beam-weight W, as indicated in Fig. 2, whereby the opposite end of the lever constitutes in effect an integral extension of the beam, so that it can control the action of the two valves V and V′. The arm 48 has pivoted thereto the rod 53, likewise connected at its lower end with the rod 54, bearing against the projection or antifriction-roll 55 at the inner end of the counterweighted lever 49. The upper end of the rod 54 is pivoted to the crank-arm 55, secured to one of the trunnions or pivots 56, projecting oppositely from the valve V′ at about its middle and working in the lugs 57 on the side frames 3 and 4.

On the descent of the weighing mechanism the lever 49 will act to prevent the two valves from being closed too quickly by the weight 47, it being apparent, by reason of the connection between said valves, that said weight serves to close them both. On the return of

the lever 49 to its primary position it acts as an actuator to open simultaneously the two valves V and V'.

In Figs. 2 and 8 the valves V and V' are represented occupying their normal positions, each being at one side of the stream falling from the hopper H. When a certain amount of material has been received by the load-receiver G, it, with the poising ends of the two beams B and B', will descend, so that the inner end of the lever 49, by moving away from the rod 54, will permit the valves V and V' to be closed, they being operated in opposite directions by the falling weight 47, and the lower portion of the valve or oscillating blade V' being swung over the valve V, as indicated in Fig. 9, this operation being completed when the receiver G is overloaded.

The front wall of the supply-hopper is provided with the overhanging hood or guard 59, adapted to prevent spattering and consequent waste of the material.

The load-reducing means in the present case consists of a spout 60, movable or oscillating hopper 61, and valve 62 for the hopper. The spout 60 is secured to one side of and communicates with the interior of the load-receiver G near the upper side thereof, it being adapted to deliver a stream into the hopper 61, which is pivoted, as at 62', at its upper end to the lower end of the spout 60, and consequently forms a part of the weighing mechanism.

During the normal operation of the machine the valve 62 covers the outlet of the load-reducing hopper 61, as indicated in Figs. 3 and 4.

When the load-receiver has been overcharged, the hopper 61 will be shifted relatively to its valve 62 for permitting the surplus to pass into a surplus-receiver, such as S, supported for movement or oscillation below said hopper and suspended from the carrier or lever 65, pivoted, as at 66, to the extension 67 on the side frame 4.

Means, such as the weight 68, connected with the hopper 61, is provided for normally holding the same in its primary position (represented in Fig. 3) over the valve 62, said weight resting on the stop 69 on the side frame 4. The surplus-receiver S is closed, normally, by the valve 70, pivoted, as at 71, to said surplus-receiver, the valve being maintained in its shut position by reason of its weight and bearing against the stop 72 on the hopper.

When the hopper 61 is shifted in the manner hereinbefore specified, it is adapted to deliver a part of its contents and part of the contents of the load-receiver into the surplus-receiver S, said hopper being shifted in the present instance by the beam B'. The hopper 61 has pivoted thereto at one side of its center of movement the rod 75, terminating in a loop 76, embracing a projection 77 at the poising end of the scale-beam B'. When the beam B' has nearly reached the limit of its downstroke, the projection 77 will strike the lower end of the loop 76, thereby drawing down the link 75 and swinging the hopper 61 to the right, whereby a stream can flow from said hopper into the surplus-receiver S. When the load-receiver is lightened, it will rise, so that the weight 68 on the hopper 61 can return it to its primary position over the valve 62, as indicated in Fig. 3, thereby to stop the further withdrawal of the material from the load-receiver, it being understood that at this time the load is completed or poised.

It will be apparent that on the discharge of the material from the receiver G the mass in the spout 60 and hopper 61 constitutes a part of the weighed or true load, and for the purpose of discharging said spout and hopper the valve 62 will be opened by suitable means, whereby the contents of the two parts can gravitate into the load-receiver through the spout 62'', communicating with the interior of the receiver and located in oblique line with the hopper, said spout 62'' being secured to one side of the load-receiver.

The valve-hub 80 has secured thereto the crank-arm 81, to which the link 82 is pivoted, said link being jointed at its opposite end to the crank-arm 85 on the rock-shaft 35. The toggle-breaking device T, it will be remembered, is carried by the rock-shaft 35. When said toggle-breaker operates in the manner hereinbefore specified, the shaft 35 will be rocked, and the valve 62, by reason of the intermediate connections, will be swung open, as shown in Fig. 7, to permit the contents of the spout 60 and the hopper 61 to pass into the emptying load-receiver G.

It will be remembered that the material withdrawn from the weighing mechanism through the spout 60 and swinging hopper 61 is delivered into the surplus-receiver S, the gravity-valve 70 of which is shut and held against the stop 72, as represented in Fig. 5.

The surplus-receiver S or other convenient member has means operative therewith for preventing the ascent of the load-receiver G and the beam mechanism B and B' to too great a height during the load-reducing period, so that the removal of the entire surplus or excess is assured, said means in the present case consisting of a stop, as 90, operative with the lever or carrier 65 and consisting of an arm extending downward from its hub. The carrier, and consequently the surplus-receiver S and stop 90, will be held against action for a certain period of time, or while the overload is being supplied, and for this purpose I have illustrated a stop or detent, as 91, operative with the beam B and consisting of an angular projection or finger at its inner end adapted to engage the stop 90, as indicated in Fig. 3, to hold the counterweight 65' of the carrier or lever 65, and hence the other parts connected therewith, against action.

When the beam mechanism has nearly reached the limit of its downstroke, the stop

91 will pass out of contact with the stop 90, as represented in Fig. 5, whereby the weight 65′ can drop until the lever abuts against the stop 66′ on the framework, the stop 66″ on the framework limiting the opposite movement of the lever. On the ascent of the weighing mechanism, and when it has moved a short distance during the load-reducing period, the stop 91 of the scale-beam will abut against the coöperating stop 90, as illustrated by the dotted lines in Fig. 6, so that the further movement of the weighing mechanism will be prevented and the beam B will hold the spout 61 in its shifted position (represented in Fig. 6) to assure the removal of the surplus.

When the surplus-receiver is filled or has received the excess withdrawn from the weighing mechanism, it will be lowered, the weight 65, of course, being raised, the stop 90 being simultaneously carried out of contact with the stop 91, as represented in Fig. 7. It is understood that about this time the true load is discharged by the tripping of the latch 41, to which I have hereinbefore referred.

The tripper for the latch 41 is designated by T′, it being of the "by-pass" type well known in this art and carried upon the side frame 3. Said tripper is adapted to raise the latch out of engagement with the crank-arm 38 when the surplus is entirely removed from the weighing mechanism, whereby the closers L and L′ can be released in the manner hereinbefore set forth.

The pivot 56 of the valve V′ has a crank-arm 95, to which is pivoted the rod 96, having at its lower end the loop 97, embracing the projection 98 on the valve 70. By reason of the loop 97 at the lower end of the rod 96 the valve V′ can operate without affecting the valve 70, and the latter can be closed during the removal of the surplus. When, however, the hopper S is in its lowest position, (shown in Fig. 7,) the lower end of the loop 97 will be against the projection 98, so that when the valve V′ is opened in the manner hereinbefore described the rod 96 will be raised and the valve 70 thereby opened to permit the material in the receiver S to pass into the trough 99, a portion of which is shown in Figs. 1 and 3, and the surplus can be disposed of in the manner represented in the Letters Patent hereinbefore referred to.

In connection with the weighing mechanism I provide a variable-efficiency device adapted to act against one of the members thereof for the purpose of preventing the load-receiver G from descending too quickly. The variable-efficiency device is designated by E, and it consists of a counterweighted lever pivoted, as at 100, on the scale-beam B, the weight 101 of said lever being caused to approach the weight W as the load-receiver descends, whereby the leverage of the beam B is increased to such an extent as to retard the descent of the load-receiver to insure its being overcharged. A suitable stop, preferably mounted on the load-receiver G, is provided to hold the device E against movement, whereby the center of gravity of its weight can be caused to approach the beam-weight W. The stop on the load-receiver for this purpose is designated by 103, the horizontal arm 104 thereof having a counterweight 105 to hold the arm 106 thereof against the stop 107′ on the load-receiver, it being in the form of a by-pass. The arm 106 is adapted to engage the lug 107 on the device E, as indicated in Fig. 4, wherein the parts are shown occupying their initial positions.

On the descent of the load-receiver the counterpoised side of the beam B, upon which the device E is pivoted, will be caused to ascend, whereby, the stop 103 being in engagement with the device E, the arm 100′ of said device will be elevated to cause the center of gravity of the weight to approach the beam-weight W for effecting the peculiar result hereinbefore specified.

When the load-receiver has nearly reached its lowest position, the end of the working arm 106 of the by-pass stop 103 will cross the arc of oscillation of the arm 100″ of the device 100, as indicated in Fig. 5, so that the weighted arm 100′ of the device E can drop against the stop 108 on the arm, thereby to subtract the effect of the device, so that the load can be accurately poised. The working arm 106 of the stop 103 being below the lug 107, as shown in Fig. 5, and said stop being of the by-pass kind, the parts can readily return to their primary positions, as will be obvious. The arm 106 on the ascent of the load-receiver is pushed to one side by the lug 107 as the load-receiver rises to receive a new load.

In connection with the weighing mechanism I provide a load-receiving regulator having an extensible wall or walls, as will hereinafter appear, said regulator being preferably operative with a locker or stop for one of the members of the machine, such as the valve V. The regulator is designated by R, and it is situated below the load-receiver, it having front and rear walls 110 and 112, connected by the hinged leaves or plates 113 and 114 at opposite sides thereof. The leaves 113 are hinged to each other, as at 115, and also to the opposite ends of the plates 110 and 112, and the leaves 114 are likewise connected, as at 116. The middle pivot 115 and 116 of each of the series of leaves passes through the lugs or ears 117, disposed in the base 2 at opposite sides thereof, as shown, respectively, in Figs. 8, 11, and 12. The lugs or ears form a convenient support for the regulator. On the discharge of a load from the receiver G it is emptied into the regulator R, as shown, respectively, in Figs. 9 and 12, which action spreads the opposite walls 110 and 112 of the regulator apart until they abut against the stops 110′ and 112′ within the base 2, such action of the regulator being utilized to throw a stop or locker, as 120, into action for blocking or restraining the valve.

The wall 112 of the regulator supports in

bearings 121 the rock-shaft 122, having at its opposite ends the crank-arms 123 and 124, to which are pivoted the links 125 and 126, furnished with hubs 125′ and 126′ at their opposite ends to receive the pivots 127 and 128 in the lugs 129 and 130 on the wall 110 of the regulator.

The shaft 122 carries a rearwardly-extending crank-arm 131, furnished with a weight 132 for returning the regulator-walls 110 and 112 to their primary positions, as indicated in Fig. 8. The crank-arm 131 has pivoted thereto the rod 133, bent near its upper end and pivoted, as at 134, to the locker 120.

When the load is discharged into the regulator, the sections or walls 110 and 112 thereof will be extended or forced outward by the material, so that the links 125 and 126 and crank-arms 123 and 124, acting as toggles, will raise the arm 131, thereby thrusting the rod 133, and consequently the locker 120, upward for rendering the latter effective to block the opening of the valve.

The locker 120 consists of a lever pivoted to the vertical hanger 6′ on the bracket 6 and having intermediate its end the auxiliary stop or curved lug 135.

In Fig. 8 the valve V is shown wide open and the regulator R in its primary position.

In Fig. 9 the valve V is illustrated as having been shut and the load as discharged into the regulator R, the walls 110 of which have been shifted to elevate the rod 133 and locker 120.

When the locker 120 is elevated, the auxiliary stop or curved lug 135 will be moved across the path of oscillation of the valve, and by reason of its connection with the valve V′ the latter is also held against action. When the material passes out of the regulator R, the weight 132 by dropping will return the two walls to their initial positions, as will be obvious.

In connection with the closer mechanism embodying the closers L L′ and valve mechanism embodying the valves V and V′, I provide the usual interlocking stops 140 and 141, the stop 140 being secured to the valve-shaft 45. The stop 141 is pivoted, as at 142, to the load-receiver, it having a crank-arm 143, to which the rod 144 is pivoted, said rod being likewise connected at its lower end to the crank-arm 145 of the closer-actuating weight 30, as indicated in Fig. 2.

The operation of the hereinbefore-described machine, briefly set forth, is as follows: In Figs. 1, 2, 3, and 8 the load-receiver and beam mechanism are shown occupying their normal positions, and the full volume of the supply-stream is represented in the last-mentioned figure as flowing into the receiver G, it striking in its fall the oppositely-inclined roof or plate 13, fixed in the load-receiver. When a certain part of the overload has been received, the load-receiver and beam mechanism will descend and the projection 55 on the counterweighted lever 49, carried by the beam B, by falling away from the rod 54 will permit the weight 47 to drop for closing the valve V, and hence the valve V′ by reason of its connection therewith, the two valves being closed when the receiver G is overloaded. When the load-receiver and beam mechanism have reached substantially their lowest positions, (indicated in Fig. 5,) the beam B′ will pull the link 75 downward, thereby swinging the load-reducing hopper 61 away from its valve 62 and over the surplus-receiver S, so that the surplus carried by the load-receiver G can pass through the spout 60 and hopper 61. As soon as the load-receiver lightens it will be elevated by the beam mechanism, and the beam B′ by rising will permit the weight 68 to swing the load-reducing hopper over its valve 62, thereby to stop the further withdrawal of material from the load-receiver, this operation being completed when the load is poised.

It will be understood that the valve 70 for the surplus-receiver is held shut by its own weight and that the stop 90 is swung into the path of movement of the coöperating stop 91 on the scale-beam B, whereby the load-receiver and beams cannot ascend too high, as the stop 90 will arrest the progress of the stop 91 until the surplus is within the receiver S, at which time the latter is lowered and the stop 90 moved to one side of the stop 91. When the surplus is entirely removed and on the ascent of the load-receiver G, the latch 41 will be tripped by the tripper T′ on the framework, as hereinbefore specified, so that the toggle-breaker T can be forced downward to throw the pivotal points 23, 24, and 25 of the several toggles D out of line, whereby the closers can be forced to their wide-open positions (indicated in Fig. 9) by the pressure of the mass in the receiver G, the load being discharged into the regulator R, which in the manner hereinbefore specified throws the valve-locker 120 into operation. When the mass passes clear of the two closers L and L′, they will be returned to their shut positions by the weight 30, and the load-receiver G and beam mechanism B and B′ will return to their primary positions to repeat the operation, which takes place when the regulator R has actuated the locker 120 to release the valve V.

Having described my invention, I claim—

1. The combination of weighing mechanism embodying a load-receiver; a hood to support the major part of the load and so situated in said load-receiver as to form a series of discharge-openings between the same and the load-receiver; a series of closers covering said openings; and a locker between and connecting the closers.

2. The combination of weighing mechanism embodying a load-receiver; a hood situated therein and adapted to support the major part of the load and so mounted as to form a series of discharge-openings between the same and the load-receiver; a series of closers

covering the respective openings; and a toggle between the closers.

3. The combination of weighing mechanism embodying a load-receiver; a hood situated therein and adapted to support the major part of the load and so mounted as to form a series of discharge-openings between the same and the load-receiver; a series of closers covering the respective openings; a toggle between the closers; and toggle-breaking means.

4. The combination of weighing mechanism embodying a load-receiver; means for supplying the same with material; a plurality of closers; a dead-lock toggle for locking the closers; and a toggle-breaking device coöperative therewith and actuated by the material being weighed.

5. The combination of weighing mechanism embodying a load-receiver; a plurality of closers; a dead-lock toggle for locking the closers; and a toggle-breaking device situated in the load-receiver and operated by the material being weighed.

6. The combination of weighing mechanism embodying a load-receiver; means for supplying the same with material; a plurality of closers; a toggle for locking the closers; and a toggle-breaking device actuated by the material and consisting of two connected leaves.

7. The combination of weighing mechanism embodying a load-receiver; means for supplying the same with material; a plurality of closers; a toggle for locking the closers; a toggle-breaking device mounted within the load-receiver, and consisting of two leaves hinged to each other; and a detent for normally holding the toggle-breaking device against action.

8. The combination of weighing mechanism embodying a load-receiver; means for supplying the same with material; a plurality of closers; a dead-lock toggle for locking the closers; and a toggle-breaking device within the load-receiver coöperative therewith and actuated by the material being weighed.

9. The combination of weighing mechanism embodying a load-receiver; a plurality of closers for said load-receiver; a dead-lock toggle for locking the closers; a toggle-breaking device situated in the load-receiver and actuated by the material being weighed; a shaft carrying the toggle-breaking device and connected with said closers; an arm on the shaft; and a latch for engaging the arm.

10. The combination of weighing mechanism embodying a load-receiver; means for supplying the same with material; a plurality of closers for said load-receiver; a toggle for locking the closers; a toggle-breaking device; a shaft carrying the said toggle-breaking device and having two oppositely-disposed crank-arms; a latch for engaging one of the crank-arms; and a rod connected with the other crank-arm and also with the closers.

11. The combination of weighing mechanism embodying a load-receiver; a plurality of closers for said load-receiver; a weight connected with the closers; a toggle for locking said closers; a toggle-breaking device; a shaft carrying the toggle-breaking device and furnished with oppositely-disposed arms; a rod pivoted to one of the arms and to said weight; and a latch for engaging the other arm.

12. The combination of weighing mechanism embodying a load-receiver; a plurality of closers for said load-receiver; a dead-lock toggle for locking the closers; a shaft having a crank-arm connected with the toggle; a toggle-breaking device actuated by the material; a shaft carrying the toggle-breaking device; connections between said shafts; and means normally adapted to hold the toggle-breaking device.

13. The combination of weighing mechanism embodying a load-receiver; means for supplying the same with material; a plurality of closers for said load-receiver; a dead-lock toggle for locking the closers; a toggle-breaking device in position to be actuated by the material being weighed; a latch normally adapted to hold the toggle-breaking device; and a latch-tripper.

14. The combination of weighing mechanism embodying a load-receiver; a plurality of closers; a toggle for locking the closers; a shaft having a crank-arm; a link connected with the crank-arm and toggle; and a toggle-breaking device connected with said shaft.

15. The combination of a load-receiver; beam mechanism; closer and valve mechanism, the valve mechanism comprehending a plurality of valves; a pair of connected rods one of which is adapted to bear against the beam mechanism, said rods being connected, respectively, with the valves; and coöperating stops operative, respectively, with the valve and closer mechanisms.

16. The combination of weighing mechanism embodying a load-receiver; a series of closers supported within the same; a toggle for locking the closers shut; a shaft connected with the toggle; a weight secured to the shaft and having a crank-arm; a stop on the load-receiver, connected by a rod with said crank-arm; and valve mechanism furnished with a stop coöperative with the first-mentioned stop.

17. The combination of a load-receiver and supporting-beam mechanism; a plurality of supply-controlling valves; a pair of rods connected to each other and to the respective valves and bearing against the beam mechanism; and valve-actuating means.

18. The combination of a load-receiver and supporting-beam mechanism therefor; a pan-valve supported for oscillation; a coöperative valve consisting of a blade having projecting trunnions intermediate its upper and lower edges; bearings on the framework, to receive the trunnions; a crank-arm secured to one of the trunnions; a rod connected to the crank-arm and bearing against the beam mechan-

ism; and a second rod attached to the first-mentioned rod and connected with the pan-valve.

19. The combination of a load-receiver and supporting-beam mechanism therefor; a pan-valve; a shaft supporting the valve and having a crank-arm provided with a valve-actuating device; a rod pivoted to said crank-arm; a coöperating valve consisting of a blade having projecting trunnions; bearings on the framework, for supporting said trunnions; a crank secured to one of the trunnions; and a rod pivoted to said crank and connected with the other rod and bearing against the beam mechanism.

20. The combination of weighing mechanism embodying a load-receiver; overloading means therefor; load-reducing means consisting of a swinging hopper and a movably-mounted valve for the hopper; means operative during the weighing of a load for swinging the hopper out of and into line with its valve; and means for subsequently opening the valves.

21. The combination of weighing mechanism embodying a load-receiver; overloading means therefor; load-reducing means consisting of a swinging hopper and a movably-mounted valve for the hopper; means connected with the weighing mechanism for swinging the hopper out of line with its valve; an independent device for returning it to its normal position; and means for subsequently opening the valve.

22. The combination of weighing mechanism embodying a load-receiver; overloading means therefor; load-reducing means consisting of a swinging hopper and a movably-mounted valve for the hopper; a weight connected with said hopper; means operative during the weighing of a load for swinging the hopper out of line with its valve; and means for subsequently opening the valve.

23. The combination of weighing mechanism embodying a load-receiver; overloading means therefor; load-reducing means consisting of a swinging hopper and a movably-mounted valve for the hopper; means operative during the weighing of a load for successively swinging the hopper into and out of line with its valve; and means operated by the material being weighed for subsequently opening the valve.

24. The combination of weighing mechanism embodying a load-receiver; overloading means therefor; load-reducing means consisting of a swinging hopper and a movably-mounted valve for the hopper; means operative during the weighing of a load for successively swinging the hopper into and out of line with its valve; and a device located in the receiver to be acted upon by the material and connected with the valve.

25. The combination of weighing mechanism embodying a load-receiver; overloading means therefor; load-reducing means consisting of a swinging hopper and a movably-mounted valve for the hopper; means operative during the weighing of a load for successively swinging the hopper into and out of line with its valve; a device situated in the load-receiver to be acted upon by the material; a shaft for carrying said device; and a connection between the shaft and the valve.

26. The combination of weighing mechanism embodying a load-receiver; overloading means therefor; load-reducing means consisting of a swinging hopper and a movably-mounted valve for the hopper; means operative during the weighing of a load for successively swinging the hopper out of and into line with its valve; means for subsequently opening the valve; and a surplus-receiver.

27. The combination of weighing mechanism embodying a load-receiver; overloading means; load-reducing means consisting of a swinging hopper and a movably-mounted valve for the hopper; means operative during the weighing of a load for successively swinging the hopper into and out of line with its valve; means for subsequently opening the valve; a surplus-receiver in position to catch the material from the hopper when it is shifted in one direction; and a spout on the load-receiver, in position to receive the material that gravitates from the hopper when its valve is opened.

28. The combination of weighing mechanism embodying a load-receiver; overloading and load-reducing means, the load-reducing means embodying a valve; and means for actuating the valve, consisting of a device supported in position to be acted upon by the material being weighed.

29. The combination of weighing mechanism including a load-receiver provided with a plurality of closers; a toggle for locking the closers; overloading and load-reducing means, the load-reducing means embodying a valve; and a toggle-breaking device connected with said valve.

30. The combination of weighing mechanism embodying a load-receiver; overloading and load-reducing means; a surplus-receiver; a carrier for the surplus-receiver, supported upon the framework for oscillation; and means operative with the beam mechanism for normally limiting the movement of the carrier.

31. The combination of weighing mechanism embodying a load-receiver; overloading and load-reducing means; a surplus-receiver; a counterweighted carrier for the surplus-receiver; and means for normally holding the carrier against movement.

32. The combination of a load-receiver and supporting-beam mechanism therefor; overloading and load-reducing means; a surplus-receiver; and means on the beam mechanism for normally limiting the action of the surplus-receiver.

33. The combination of a load-receiver and supporting-beam mechanism therefor; overloading and load-reducing means; a surplus-

receiver; a carrier for the surplus-receiver, having a stop; and a coöperating stop on the beam mechanism.

34. The combination of weighing mechanism embodying a load-receiver and beam mechanism; overloading and load-reducing means; a movably-mounted surplus-receiver; and a stop operative with the surplus-receiver for blocking the ascending movement of one of the members of the weighing mechanism.

35. The combination of weighing mechanism embodying a load-receiver; overloading means therefor; load-reducing means operative to effect the removal of the surplus; a surplus-receiver; and means operative to block the weighing mechanism when it reaches a certain point in its ascent, thereby to effect the removal of the surplus by the load-reducing means.

36. The combination, with weighing mechanism including a load-receiver, of a variable-efficiency device shiftable to apply its effect to the weighing mechanism, and means including a by-pass for temporarily intercepting said variable-efficiency device.

37. The combination of a load-receiver and supporting-beam mechanism; a variable-efficiency device carried by the beam mechanism; and a by-pass stop on the load-receiver, adapted to engage said device.

38. The combination of a load-receiver and its supporting-beam mechanism provided with a stop; a counterweighted lever pivoted upon the beam mechanism, one of its arms having a lug; and a stop on the load-receiver, adapted to engage said lug.

39. A load-receiving regulator two of the walls of which are connected by hinged leaves or plates, in combination with bearings on the framework for supporting certain of the pivots of the hinges.

40. A load-receiving regulator two of the walls of which are connected by hinged leaves or plates, in combination with bearings on the framework for supporting certain of the pivots of the hinges; and means for limiting the movement of the walls.

41. The combination, with a weighing device involving supplying and discharging mechanisms, of a locker for one of said mechanisms; a regulator having a wall flexible about a vertical axis; and connections between the regulator and locker.

42. The combination, with a load-receiver, of a stream-supply device; a valve; a locker for said valve; a regulator in position to receive material discharged from the load-receiver, and having a wall flexible about a vertical axis; and a connection between the regulator and the locker for operating the latter on the movement of said flexible wall.

43. The combination, with a load-receiver, of a stream-supply device; a stream-controller; a load-receiving regulator having two fixed walls; a series of hinged plates connecting said fixed walls at the opposite ends of the latter; a shaft carried by one of the fixed walls and connected with the other; and a connection between said shaft and the stream-controller.

44. The combination, with a weighing device involving supplying and discharging mechanisms, of a locker for one of said mechanisms; a load-receiving regulator having a wall extensible about a vertical axis; a shaft carried by one of the walls and having a crank-arm; a link connected to said crank-arm and another wall of the regulator; and a connection between said locker and the regulator.

45. A load-receiving regulator having an extensible wall operated in one direction by material, in combination with means for returning the regulator to its primary position; and weighing mechanism embodying a load-receiver dischargeable into the regulator.

46. A load-receiving regulator having a wall extensible by material, in combination with a weight for returning said wall to its primary position; and weighing mechanism embodying a load-receiver dischargeable into the regulator.

47. A weighing-machine embodying a load-receiving regulator having two fixed walls at its opposite sides, and a series of hinged plates connecting said walls at their opposite ends.

48. A load-receiving regulator having two fixed walls at its opposite sides, and a series of hinged plates connecting the said fixed plates at their opppsite ends, in combination with a valve; a locker for said valve; and connections between the locker and the regulator.

49. The combination, with a weighing device, of supply and discharge mechanisms; a locker for one of said mechanisms; a regulator including a fixed wall on the framework; a series of hinged plates connected to the opposite ends of said fixed walls and to the framework; and a third wall fixed to the opposite ends of the series of hinged plates, the hinged plates being movable about vertical axes and being flexed when a load is discharged into the regulator; and means operated by the regulator for actuating said locker.

50. The combination, with a weighing device involving supply and discharging mechanisms, of a locker for one of said mechanisms; a load-receiving regulator having its opposite walls flexible about vertical axes; a shaft carried by one of the walls and having a crank-arm; a second crank-arm on said shaft, provided with a weight; and a connection between said weighted crank-arm and the locker for operating the latter.

FRANCIS H. RICHARDS.

Witnesses:
F. N. CHASE,
HEATH SUTHERLAND.